FG 700S/F Series

Direct Digital Synthesis Function Generator

Operating Manual

MOTECH

SAFETY PRECAUTION

SAFETY CONSIDRATIONS

The Model FG700S/F series Direct Digital Synthesis Function Generator has been designed and tested according to EN61010-1:2001 and EN61326:1997.

SAFETY PRECAUTIONS
SAFETY NOTES

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. The manufacturer assumes no liability for the customer‘s failure to comply with these requirements.

BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage is installed.

SAFETY SYMBOLS

Caution, risk of electric shock

Earth (ground) terminal

Equipment protected throughout by double insulation or reinforced insulation

Caution (refer to accompanying documents)

Equipment complies with current EU directives

Protective earth (ground) terminal

Chassis terminal

Indoor use only

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the instrument. Return the instrument to a qualified dealer for service and repair to ensure that safety features are maintained.

INSTRUMENTS WHICH APPEAR DAMAGED OR DEFECTIVE SHOULD BE MADE INOPERATIVE AND SECURED AGAINST UNINTENDED OPERATION UNTIL THEY CAN BE REPAIRED BY QUALIFIED SERVICE PERSONNEL.

WARRANTY INFORMATION

ONE-YEAR-LIMITED WARRANTY

MOTECH INDUSTRIES INC. (MOTECH) warrants to the original user or purchaser that the unit is free from any defects in material or workmanship for a period of one year from the date of purchase. If any defect is discovered within the warranty period, MOTECH will repair or replace the unit, subject to verification of the defect or malfunction, upon delivery or prepaid shipment to MOTECH.

This warranty does not apply to defects or to physical damage resulting from abuse, neglect, accident, improper repair, alteration, or unreasonable use of the unit, resulting in (but not limited to) cracked or broken case or parts, or to units damaged by excessive heat. Except upon initial purchase, this warranty does not cover finish or appearance items nor does it cover items damaged in shipment to MOTECH for repair or calibration.

To receive service under this warranty, you must include proof of purchase, including date and place of purchase, (a copy of your purchase receipt) or MOTECH will not be responsible for repairs or replacement of the unit under warranty.

Any applicable implied warranties, including warranties of merchant ability and fitness for a particular use, are hereby limited to one year from the date of purchase. Consequential or incidental damages resulting from loss of use, or from a breach of any applicable express or implied warranties are hereby excluded.

The warranty is not to substitute all other agreements and warranties, general or special, express or implied, and no representative or person is authorized to assume for us any other liability in connection with the sale or use of this MOTECH product.

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1. Introduction

1.1 General

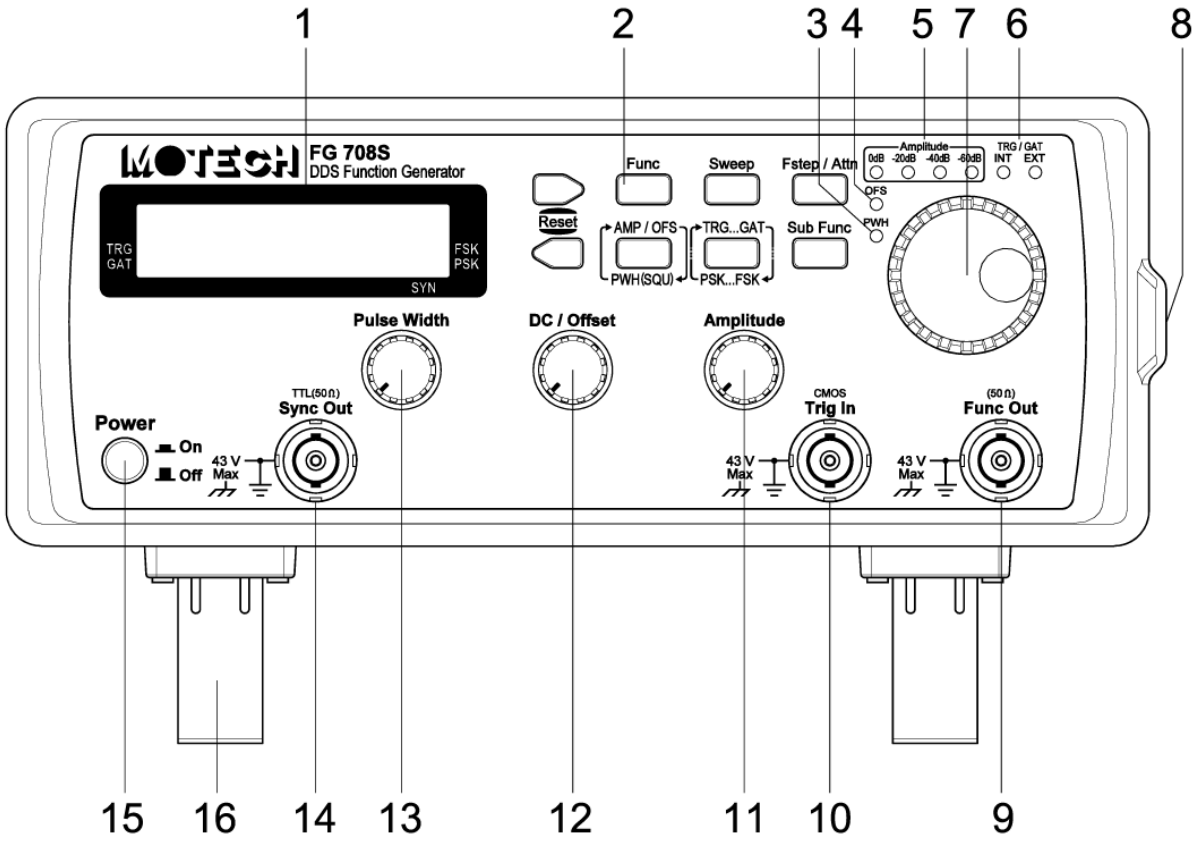
The Motech Model FG 700S/F series is a high-performance direct digital synthesize (DDS) function generator with very low noise and distortion. Combined with the DDS technology, the FG 700S/F series can output high accuracy and stable frequency to meet your test requirement of precision and accuracy. The build-in trigger/gate function allows you to control the waveform generation by internal or external. Also, the PSK and FSK modulation gives you the ability to generate such waveform for experiment or communication purpose. The FG 700F series comes with AM/FM module and frequency counter to make the function of this product more comprehensive.

1.2 Key Features

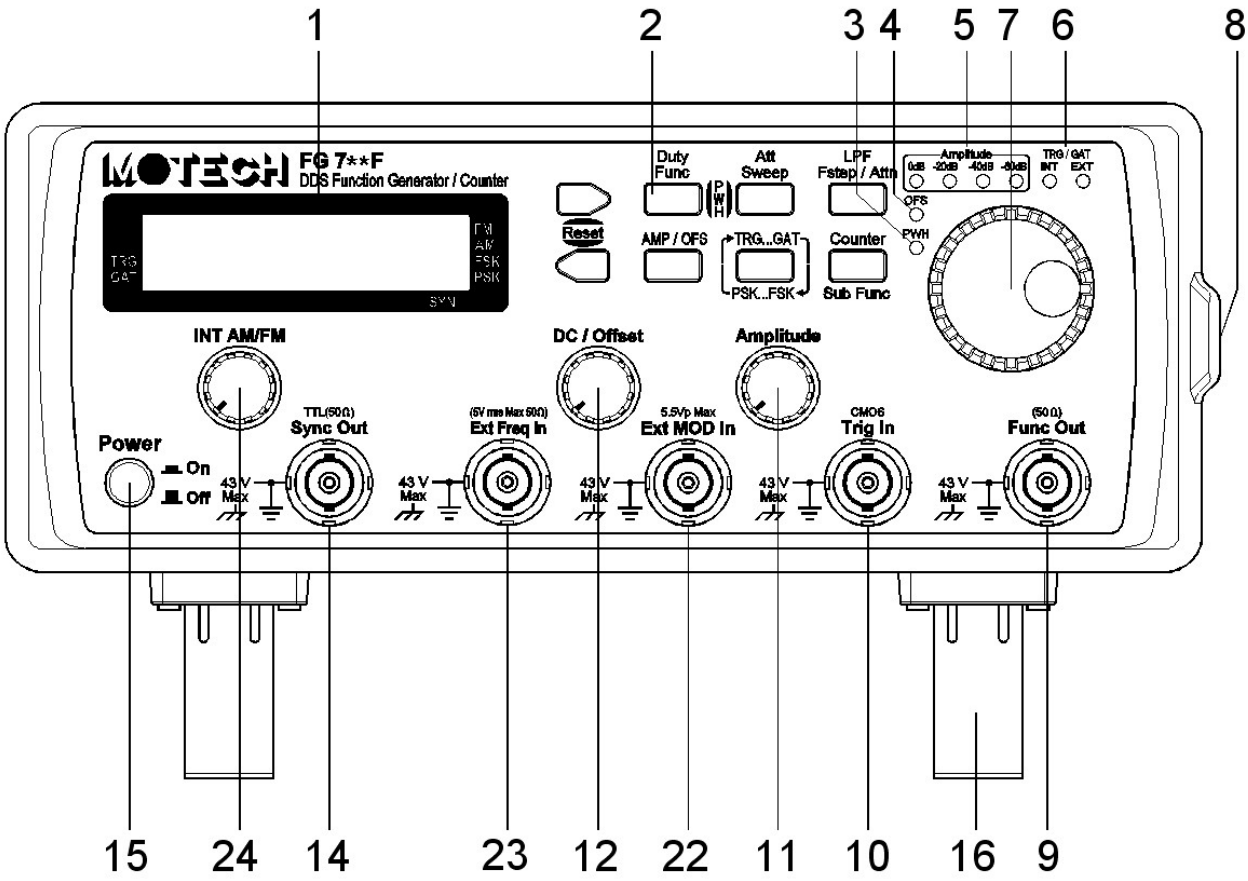
- Direct digital synthesize multi-function generator
- Sine, square, triangle, pulse, DC, synchronize and ramp up/ramp down (FG 700F series) output
- Ultra low noise and low distortion (down to 1Mv peak signal)
- PSK and FSK modulation
- Digital setting of linear or logarithm sweep function
- Trigger and gate function
- AM/FM module (FG 700F series)
- Frequency counter (FG 700F series)

1.3 Physical Description

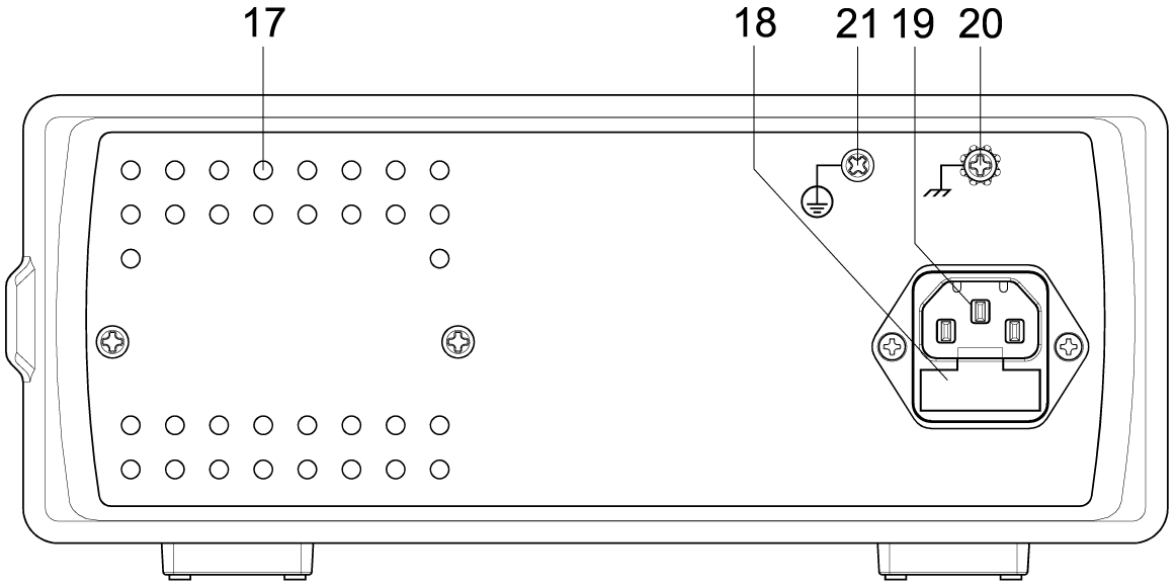
FG 700 Series Front Panel



FG 700F Series Front Panel



Rear Panel



1 Liquid Crystal Display
2 Keypad
3 Square Wave Pulse Width Adjustment On/Off Indicator
4 Output Offset On/Off Indicator
5 Output Amplitude Attenuation Range Indicator
6 External/Internal indicator of Trigger/Gate or PSK/FSK
7 Rotary with Push Button
8 Handle
9 Function Output BNC Connector (50Ω output impedance)

10 External input BNC Connector for Trigger/Gate and PSK/FSK (CMOS level)
11 Amplitude Adjustment Knob
12 DC/Offset Adjustment Knob
13 Square Wave Pulse Width Adjustment Knob
14 Sync Output Connector (TTL level with 50Ω output impedance)
15 Power Switch
16 Adjustable Feet
17 Air Ventilation Holes
18 Power-line Fuse Holder
19 Power-line AC Input Socket
20 Chassis Terminal
21 Protective Earth (Ground) Terminal
22 External Modulation Input (5.5Vp Max.) for AM/FM Function
23 External Frequency Input (5Vrms Max. @ 50Ω) for Frequency Counter Function
24 Internal AM/FM Adjustment Knob

1.4 Specification

FG 708S

Output Characteristics

a. Frequency Range : Sine, Square, Pulse and Sync Output: 100mHz ~ 8MHz
Triangle : 100mHz ~ 1MHz
b. Frequency Resolution : 100mHz or 6 digits display
c. Output Impedance : 50Ω ±5%
d. Amplitude : 1mV to 20Vp-p (open-circuit)
0.5mV to 10Vp-p (50Ω load)
e. Amplitude Resolution :
10mV@0.1V~9.99V ,1mV@10mV~99mV ,0.1mV@1mV~9.9 mV ,0.01mV@0.90mV~0.99mV (Depend on Attenuation)
f. Amplitude Accuracy : Typical 1% test at 1KHz 9Vp-p sine @ 50Ω load
g. Output Attenuation : 0, -20, -40 and -60 db
h. FUNC_OUT Self Protection : FUNC_OUT short circuit protection
Reverse voltage protection below 20Vpeak
i. DC Offset and DC Output : ±10V at open-circuit, ±5V at 50Ω load
j. DC Output Resolution :
10mV@±9.99V ,1mV@±99mV ,0.1mV@±9.9mV ,0.01mV@± 0.99mV (Depend on Attenuation)
k. DC Output Accuracy : 1% ± 5 counts (Amplitude Knob at Maximum Position)
l. Sine Wave Harmonic Distortion : DC ~ 100KHz < -55dBc typical
100KHz ~ 1MHz < -45dBc typical
1MHz ~ 8MHz < -35dBc typical
m. Spurious (non harmonic) : DC ~ 1MHz < -55dBc typical
n. Total Harmonic Distortion : DC ~ 100KHz < 0.3%
o. Square Wave : rise / fall time ≦ 15nS for 10Vp-p @ 50Ω load
overshoot < 5% of Vp for 10Vp-p @ 50Ω load
p. Pulse Generator : Frequency range : 100mHz ~ 8MHz
Amplitude : 0 ~ 10V / 0 ~ -10V / ±10V
Duty cycle : 100mHz ~ 5MHz: 20% to 80%
5MHz ~ 8MHz : 40 % to 60%
q. Triangle Wave Linearity : 99% up to 100KHz
r. Sweep (Linear / Logarithmic) : Start frequency, stop frequency and sweep step
Sweep type : up, down and up-down

s.	Sync Output	: Frequency range	: 100mHz ~ 8MHz
		Output level	: low level ≦0.6V @ 50Ω high level ≧1V @ 50Ω
		Output impedance	: 50Ω

Modulation Characteristics

a.	FSK	: Function	: Sine, Square or Triangle
		Frequency range	: 100mHz ~ 8MHz
		Internal rate	: 400Hz / 1000Hz
		Source	: Internal / External
b.	PSK	: Function	: Sine, Square or Triangle
		Frequency range	: 100mHz ~ 8MHz
		Phase setting	: 0.0000 to 360.0 degree
		Internal rate	: 400Hz / 1000Hz
		Source	: Internal / External

Trigger/Gate Characteristics

a.	Trigger	: Source	: Manual (rotary push) / External
		Main frequency setting	: 100mHz ~ 100KHz
b.	Gate	: Source	: Manual (rotary push) / External
		Main frequency setting	: 100mHz ~ 8MHz

General Characteristics

a.	Power Source	: AC 115V / 230V ±10%, 50Hz / 60Hz
b.	Temperature	: 0°C ~ 40°C (Operation) -20°C ~ 70°C (Storage)
c.	Relative Humidity	: up to 80%
d.	Dimension	: 235mm(W)× 95mm(H)×280mm(D)
e.	Weight	: 3Kg
f.	Accessories	: AC power cord 1 Operating Manual 1

FG 710F/720F

Output Characteristics

a.	Frequency Range	: Sine, Square, Pulse and Sync Output	: 100mHz ~ 10M/20MHz
		Triangle	: 100mHz ~ 1MHz
		Ramp Up, Ramp Down	: 100mHz ~ 20KHz
b.	Frequency Resolution	: 100mHz or 6 digits display	
c.	Output Impedance	: 50Ω ±5%	
d.	Amplitude	: 1mV to 20Vp-p (open-circuit) 0.5mV to 10Vp-p (50Ω load)	
e.	Amplitude Resolution	: 10mV@0.1V~9.99V ,1mV@10mV~99mV ,0.1mV@1mV~9.9 mV ,0.01mV@0.90mV~0.99mV (Depend on Attenuation)	
f.	Amplitude Accuracy	: Typical 1% test at 1KHz 9Vp-p sine @ 50Ω load	
g.	Output Attenuation	: 0, -20, -40 and -60 db	
h.	FUNC_OUT Self Protection	: FUNC_OUT short circuit protection Reverse voltage protection below 20Vpeak	

i. DC Offset and DC Output : ±10V at open-circuit, ±5V at 50Ω load
j. DC Output Resolution :
10mV@±9.99V ,1mV@±99mV ,0.1mV@±9.9mV ,0.01mV@±0.99mV (Depend on Attenuation)
k. DC Output Accuracy : 1% ± 5 counts (Amplitude Knob at Maximum Position)
l. Sine Wave Harmonic Distortion : DC ~ 100KHz < -55dBc typical
100KHz ~ 1MHz < -45dBc typical
1MHz ~ 10M/20MHz < -35dBc typical
m. Spurious (non harmonic) : DC ~ 1MHz < -55dBc typical
n. Total Harmonic Distortion : DC ~ 100KHz < 0.3%
o. Square Wave : rise / fall time ≦ 15nS for 10Vp-p @ 50Ω load
overshoot < 5% of Vp for 10Vp-p @ 50Ω load
p. Pulse Generator : Frequency range : 200mHz ~ 20KHz
20KHz ~ 400KHz
Amplitude : 0 ~ 10V / 0 ~ -10V / ±10V
Duty cycle : 200mHz ~ 20KHz : 0.1% ~ 99.9%
20KHz ~ 400KHz : 2% ~ 98%
q. Triangle Wave Linearity : 99% up to 100KHz
r. Sweep (Linear / Logarithmic) : Start frequency, stop frequency and sweep step
Sweep type : up, down and up-down
s. Sync Output : Frequency range : 100mHz ~ 10M/20MHz
Output level : low level ≦0.6V @ 50Ω
high level ≧1V @ 50Ω
Output impedance : 50Ω

Modulation Characteristics

a. FM : Modulation : Sine, Suqare or Triangle
Frequency range : 100mHz ~ 10KHz
Peak deviation : 4 ~ 5% of Max Frequency
Source : Internal/External
Internal source : 400Hz/1000Hz Sine Wave
External source : Any Waveform @ 5.5 Vpeak Max
b. AM : Modulation : Sine or Triangle
Modulation Depth : 0% ~ 100% (±5%)
Source : Internal/External
Internal source : 400Hz/1000Hz Sine Wave
External source : Any Waveform @ 5.5 Vpeak Max
c. FSK : Function : Sine, Square or Triangle
Frequency range : 100mHz ~ 10M/20MHz
Internal rate : 400Hz / 1000Hz
Source : Internal / External
d. PSK : Function : Sine, Square or Triangle
Frequency range : 100mHz ~10M/20MHz
Phase setting : 0.0000 to 360.0 degree
Internal rate : 400Hz / 1000Hz
Source : Internal / External

Trigger/Gate Characteristics

a. Trigger : Source : Manual (rotary push) / External
Main frequency setting : 100mHz ~ 100KHz
b. Gate : Source : Manual (rotary push) / External

Main frequency setting : 100mHz ~ 10M/20MHz

Frequency Counter

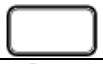
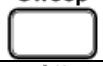
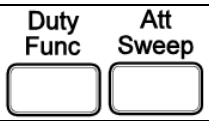
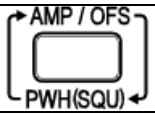
a.	Range	: 4Hz to 100MHz
b.	Accuracy	: ±5 counts
c.	Resolution	: 7 digits or (99.9999)
d.	Low pass filter	: Manual
e.	Timebase accuracy	: 50MHz±25ppm(23.5±5˚C)Optional TCXO Time Base Available
f.	Input Attenuation	: 0db,-20db
g.	Sensitivity	: 4Hz ~ 50MHz/-20dbm @ 50Ω typical
		50MHz ~ 80MHz/-10dbm @ 50Ω typical
		80MHz ~ 100MHz/-5dbm @ 50Ω typical

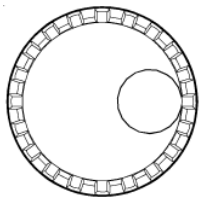
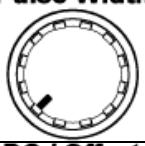
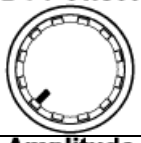
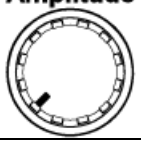
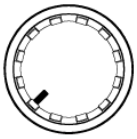
General Characteristics

a.	Power Source	: AC 115V / 230V ±10%, 50Hz / 60Hz
b.	Temperature	: 0°C ~ 40°C (Operation)
		-20°C ~ 70°C (Storage)
c.	Relative Humidity	: up to 80%
d.	Dimension	: 235mm(W)× 95mm(H)×280mm(D)
e.	Weight	: 3Kg
f.	Accessories	: AC power cord 1
		Operating Manual 1

2. Operation

2.1 Keypad and Knob Description

Key and knob	Function
	Right Key (FG700S/F Series) a. Change to the next selection. b. In frequency editing, the frequency will x10 if the cursor is off. c. In frequency editing, the cursor goes to right position if the cursor is on.
	**Function Key (FG700S Series)** a. Select the function output of sine, square, triangle or DC.
	Function Key (FG700F Series) a. Select the function output of sine, square, triangle, DC, ramp up or ramp down.
	**Sweep Key (FG700S Series)** a. Enter the sweep menu to select and set the linear or logarithm frequency sweep.
	Sweep Key/Counter Attenuation Key (FG700F Series) a. Enter the sweep menu to select and set the linear or logarithm frequency sweep. b. In counter mode, select the attenuator on/off of the external counter input.
	**Both Key Pressed Simulteniously (FG700F Seires)** a. Enter the pulse width duty adjustment of square wave and adjust by rotary.
	Frequency Step/Attenuation Key (FG700S Series) a. Enter the attenuation menu to change the output attenuation. b. Enter the frequency step menu to select and set the frequency step function.
	Frequency Step/Attenuation Key/Counter LPF Key (FG700F Series) a. Enter the attenuation menu to change the output attenuation. b. Enter the frequency step menu to select and set the frequency step function. c. In counter mode, select the low pass filter on/off.
	Left Key (FG700S/F Series) a. Change to the previous selection. b. In frequency editing, the frequency will /10 if the cursor is off. c. In frequency editing, the cursor goes to left position if the cursor is on.
	**Amplitude/Offset/Pulse Width Display Key (FG700S Series)** a. Select the display of amplitude, offset and pulse width of square wave.
	Amplitude/Offset Key (FG700F Series) Select the display of amplitude and offset.
	Trigger/Gate and PSK/FSK key (FG700S/F Series) a. Enter the trigger/gate menu to select and set the trigger/gate function. b. Enter the PSK/FSK menu to select and set the PSK/FSK function.
	Sub Function Key (FG700S Series) a. Enter the sub function menu to select and set the sync output, pulse width of square wave and offset function.
	Sub Function/Counter Key (FG700F Series) a. Enter the sub function menu to select and set the sync output, pulse width of square wave, offset, AM, FM and counter function.

	**Rotary with Push button (FG700S/F Series)** a. Change to the next selection when turning clockwise. b. Change to the previous selection when turning counterclockwise. c. In frequency editing, turn clockwise to increase the frequency setting. d. In frequency editing, turn counterclockwise to decrease the frequency setting. e. When the cursor shows up in frequency editing, press the rotary push button to cancel the cursor. f. In rotary push trigger/gate function, press the rotary push button to generate trigger/gate signal manually.
Pulse Width 	**Pulse Width Adjustment Knob (FG700S Series)** a. Adjust the pulse width of the square wave.
DC / Offset 	**DC/Offset Adjustment Knob (FG700S/F Series)** a. Adjust the DC level if the function output is set to DC. b. Adjust the offset level if the output offset is on.
Amplitude 	**Pulse Width Adjustment Knob (FG700S/F Series)** a. Adjust the amplitude of the function out.
INT AM/FM 	**Internal AM/FM Adjustment Knob (FG700F Series)** a. Adjust the internal AM/FM modulation factor output.

2.2 Opening Screen

Connect the power cord and turn on the function generator.

FG700S Series

FG700FSeries

a. Press the and together to reset the function generator. This reset function sets the function generator to default of 1KHz sine wave output at 20dB attenuation amplitude.

b. To turn off the beep of the keypad, please press and keys together for FG700S series.

c. To turn off the beep of the keypad, please press and key together for FG700F series.

Warning

Please make sure that the correct power rating feeds to the function generator. If the higher voltage (230V) feeds to 115V version of function generator, the chance of damage the function generator may happen and the fuse will blow. Please use the following rating of fuse for replacement.

115V version function generator	:	0.5A/250V fuse (slow blow)
230V version function generator	:	250mA/250V fuse (slow blow)

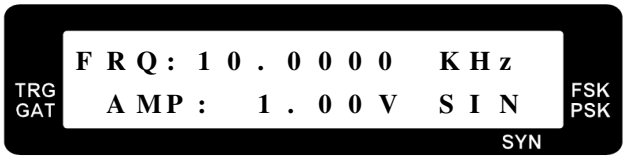
2.3 Setting Group Name

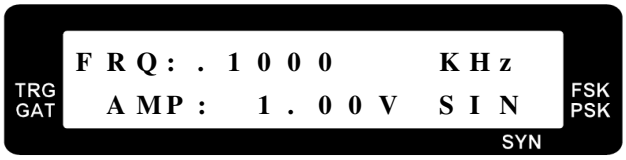
Setting Group Name

a. The setting group name is to show which parameter is set currently. For example, SW1 sets the sweep mode of linear or logarithm, SW2 sets the type of sweep and SW3 sets the sweep start frequency, etc.

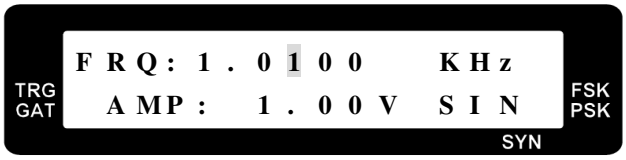
2.4 Adjust Frequency

a. When the cursor does not appear on the LCD, use and key to adjust frequency x10 and /10.





b. Adjust the to make the cursor appear and to change the frequency, use or key to change the cursor position right or left. To cancel the cursor, please press the rotary button.

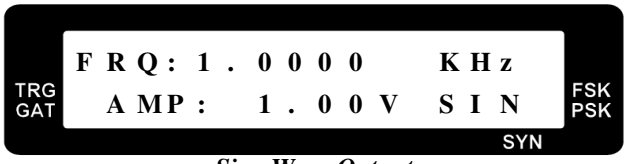


2.5 Select Waveform

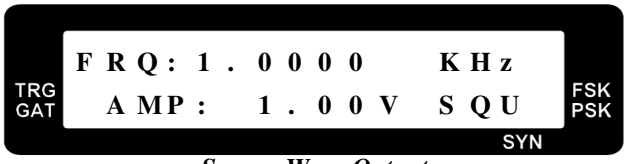
a. In FG708S series, press the

key to select output waveform. There are four waveforms to be selected (**sine**, **square**, **triangle** and **DC**).

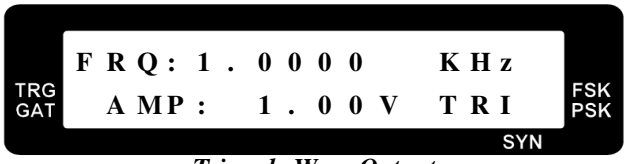
b. In FG708F series, press the Duty Func key to select output waveform. There are six waveforms to be selected (**sine, square, triangle, ramp up, ramp down and DC**).



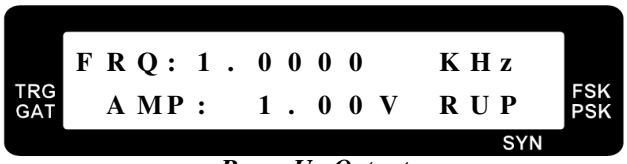
Sine Wave Output



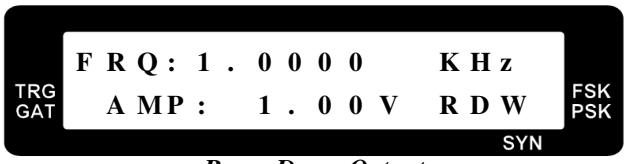
Square Wave Output



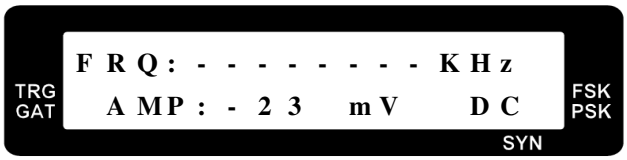
Triangle Wave Output



Ramp Up Output



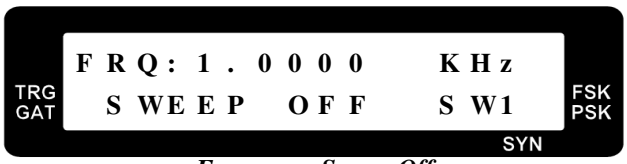
Ramp Down Output



DC Function Output

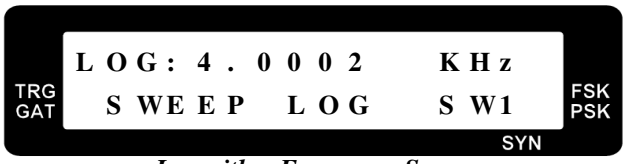
2.6 Frequency Sweep

a. Press the Sweep or Att Sweep key to enter the sweep selection menu. Use , key or to select **linear** or **logarithm** frequency sweep.



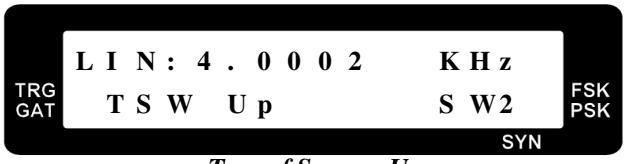
Frequency Sweep Off

Linear Frequency Sweep

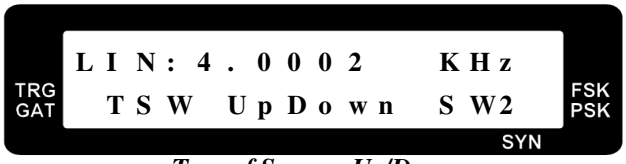


Logarithm Frequency Sweep

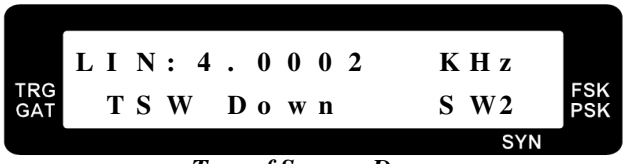
b. When linear or logarithm is selected, press the Sweep or Att Sweep key to select the **type of sweep**, **sweep start frequency**, **sweep stop frequency** and **sweep step frequency or ratio**. Use the , key or to select the desired sweep type or frequencies.



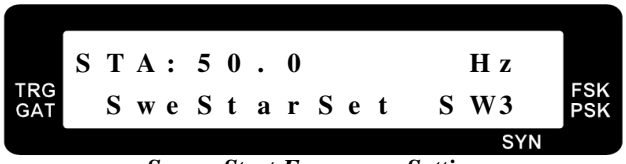
Type of Sweep : Up



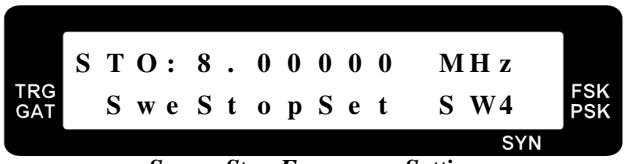
Type of Sweep : Up/Down



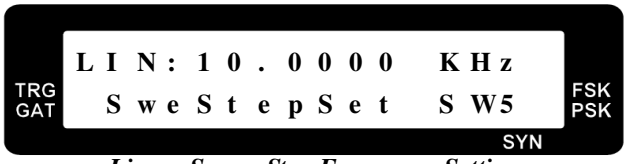
Type of Sweep : Down



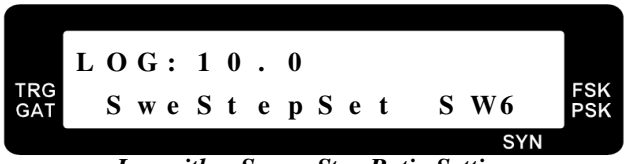
Sweep Start Frequency Setting



Sweep Stop Frequency Setting



Linear Sweep Step Frequency Setting



Logarithm Sweep Step Ratio Setting

The actual logarithm sweep step ratio is calculated by following equation:

$$\text{Actual Ratio} = \frac{F_{n+1}}{F_n} = 1 + \frac{\text{Logarithm Sweep Step Ratio Setting}}{1000}$$

For Example, if the logarithm sweep step ratio setting is set to 5 and the F_n is 1000Hz, the actual ratio is the following:

$$\text{Actual Ratio} = 1 + \frac{5}{1000} = 1.005$$

The F_{n+1}, F_{n+2} and F_{n+3} are the following:

$$F_{n+1} = \text{Actual Ratio} \times F_n = 1.005 \times 1000\text{Hz} = 1005\text{Hz}$$

$$F_{n+2} = \text{Actual Ratio} \times F_{n+1} = 1.005 \times 1005\text{Hz} = 1010.025\text{Hz}$$

$$F_{n+3} = \text{Actual Ratio} \times F_{n+2} = 1.005 \times 1010.025\text{Hz} = 1015.075125\text{Hz}$$

Note : The maximum value of the logarithm sweep step ratio setting is 10.0 and the minimum value of the logarithm sweep step ratio setting is 0.0001.

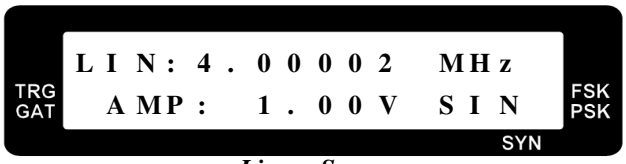
Linear Sweep Time Setting

Logarithm Sweep Time Setting

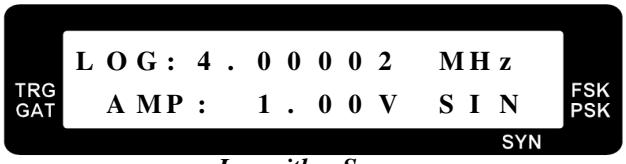
The sweep time sets the delay time between two frequencies step. It is set from 1 to 1000. The higher value will put longer delay of two frequencies step.

c. After finishing the linear or logarithm sweep setting, the , key or can be used to select sine, square, triangle, ramp up (FG700F series) or ramp down (FG700F series) output

waveform.



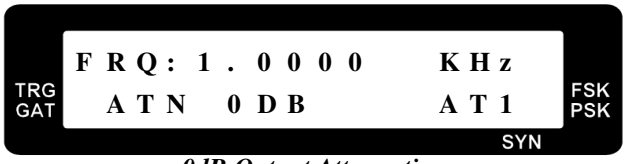
Linear Sweep



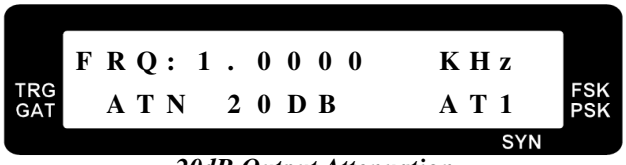
Logarithm Sweep

2.7 Output Attenuation

a. Press the Fstep / Attn or LPF Fstep / Attn key once to enter the attenuation select menu. Use the , key or to select the output attenuation of **0**, **20**, **40** and **60** dB. The corresponding amplitude indicator will show the current output attenuation setting.



0dB Output Attenuation



20dB Output Attenuation

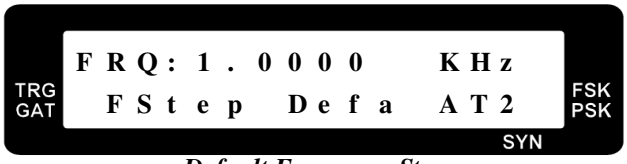
40dB Output Attenuation

60dB Output Attenuation

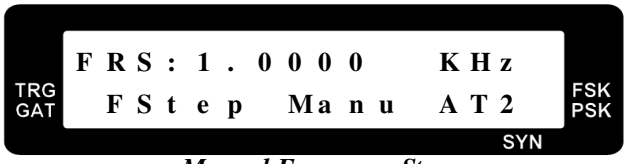
2.8 Rotary Frequency Step Setting

a. Press the Fstep / Attn or LPF Fstep / Attn key twice to enter the frequency step setting menu. Use the ,

key or to select the **default** or **manual** frequency step of rotary up/down adjustment.

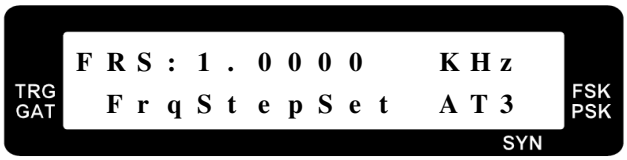


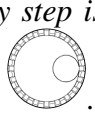
Default Frequency Step



Manual Frequency Step

b. When frequency step sets to manual, press the Fstep / Attn key again to adjust the frequency step setting. Use the , key or to adjust this setting.



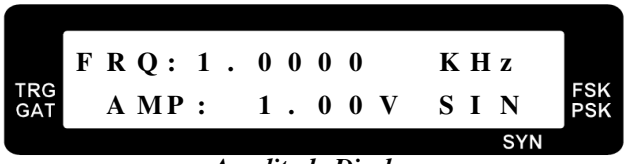
Note : Once the frequency step is set to manual, the output frequency can be controlled by the *key or*  .

2.9 Amplitude, Offset and Square Wave Pulse Width Display

a. In FG700S series, press the AMP / OFS PWH(SQU) key to show the amplitude, offset and pulse width of the square wave.

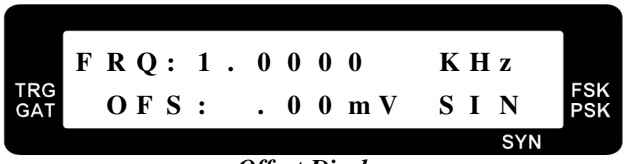
b. In FG700F series, press the AMP / OFS key to show the amplitude, offset.

c. To adjust the amplitude, please turn the Amplitude knob.

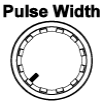


Amplitude Display

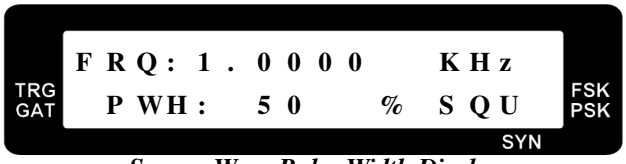
d. To adjust the DC offset, please make sure the DC offset is set to on in the sub function menu (SB3). Turn the DC / Offset knob to adjust.



Offset Display

e. To adjust the pulse width in FG700S series, please select the square waveform first and set the pulse width on in sub function menu (SB2). Turn the 

knob to adjust.



Square Wave Pulse Width Display

Note : The square wave pulse width display can be seen only if the square wave pulse width adjustment is turned on in sub function.

f. The pulse width display value will show below or over if the pulse width is under or above the following values in FG708S:

Frequency Range / Display Shows	0.1Hz ~ 5.99999MHz	6.00000MHz ~ 8.00000MHz
BELOW	< 18%	< 34%
OVER	> 81%	> 75%

g. To adjust the pulse width in FG700F Series, please select the square wave first and set the pulse width on in the sub function menu (SB4). Press the

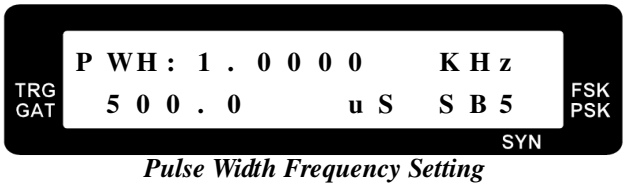
key to select SB5 menu to set the pulse width frequency. Use the , key or to set the frequency. Then, press the

key the select SB6 menu for the pulse width duty setting. Also, use the , key or to set the duty.

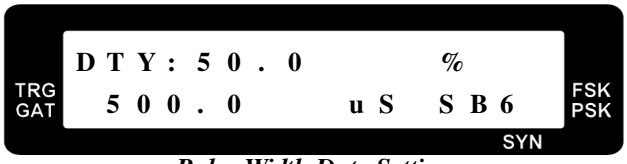
h. To quickly enter the pulse width duty setting, please press the

and

key simultenously.



Pulse Width Frequency Setting



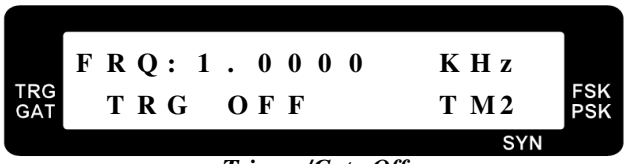
Pulse Width Duty Setting

2.10 Trigger/Gate

a. Press the

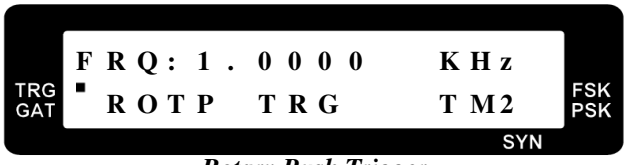
key to enter the trigger/gate selection menu.

b. Use the , key or to select **external trigger**, **rotary push trigger**, **external gate** and **rotary push gate**. The corresponding internal or external indicator will show up.



Trigger/Gate Off

External Trigger



Rotary Push Trigger

External Gate

Rotary Push Gate

2.11 Phase-Shift Keying (PSK) and Frequency-Shift Keying (FSK) Modulation

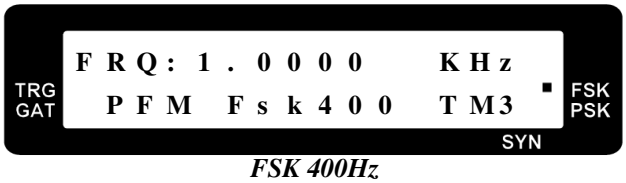
a. Press the

key twice to enter the PSK/FSK modulation selection menu.

b. Use the , key or to select **PSK 1KHz**, **PSK 400Hz**, **PSK external**, **FSK 1KHz**, **FSK 400Hz** and **FSK external**. The corresponding internal or external indicator will show up.

PSK/FSK Off

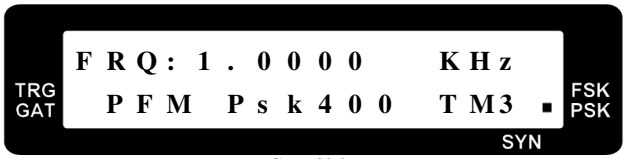
FSK External



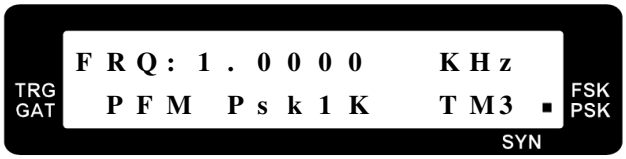
FSK 400Hz

FSK 1KHz

PSK External

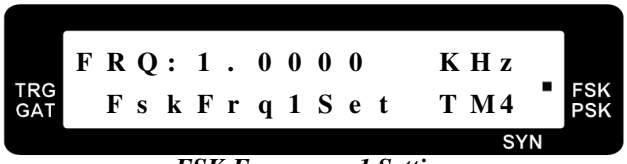


PSK 400Hz

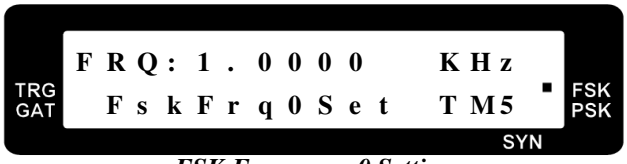


PSK 1KHz

c. If FSK turns on, press the key to enter the FSK frequency register 1 and frequency register 0 setting menu. Use the , key or to set the desired FSK frequencies.



FSK Frequency 1 Setting

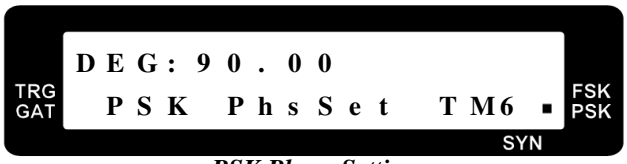


FSK Frequency 0 Setting

Note : The FSK frequency register 1 setting range is from 12.0Hz to maximum output frequency of the function generator or 12.000MHz. The FSK frequency register 0 setting range is from 0.100Hz to maximum output frequency of the function generator or 12.0000MHz.

d. If PSK turns on, press the

key to enter the PSK phase setting menu. Use the , key or to set the desired PSK phase.

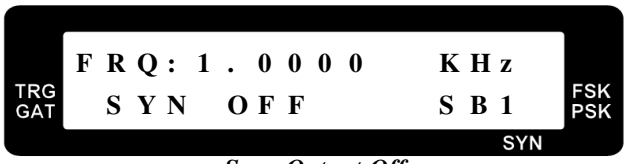


PSK Phase Setting

2.12 Sub Function

a. In FG700S series, press the

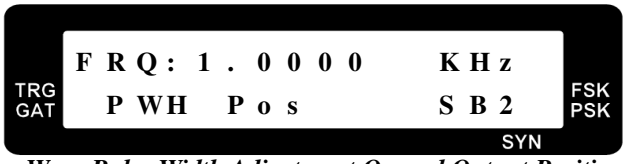
key to select **sync output on/off**, **square wave pulse width adjustment on/off** and **output offset on/off**. Use the , key or to select the desired on/off setting.



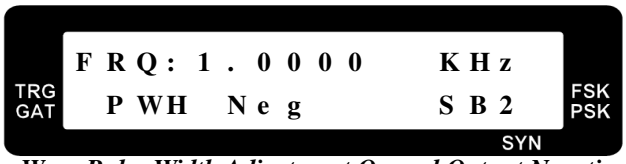
Sync Output Off

Sync Output On

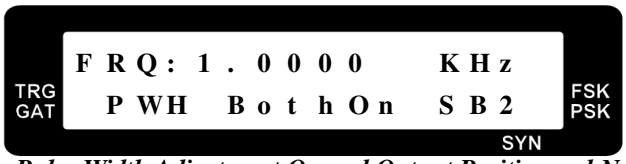
Square Wave Pulse Width Adjustment Off



Square Wave Pulse Width Adjustment On and Output Positive Pulse



Square Wave Pulse Width Adjustment On and Output Negative Pulse



Square Wave Pulse Width Adjustment On and Output Positive and Negative Pulse

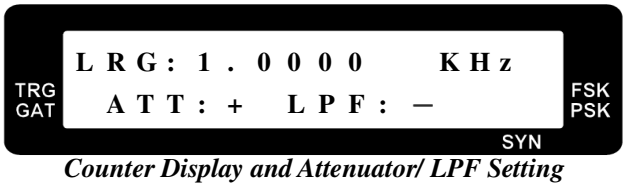
Note : The square wave pulse width adjustment on/off selection will show up in the sub function only if the output select to square wave. If the pulse width adjustment is on, the pulse width indicator will show up.

Output Offset Off

Output Offset On

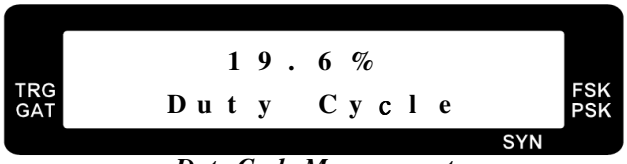
Note : If the output offset is on, the offset indicator will show up.

b. In FG700F series, press Counter / Sub Func key to select **counter display and setting**, **sync output on/off**, **output offset on/off**, **AM on/off**, **square wave pulse width adjustment on/off**, **pulse width frequency setting**, **pulse width duty setting** and **FM on/off**. Use the ▷, ◁ key or to select the desired on/off setting.



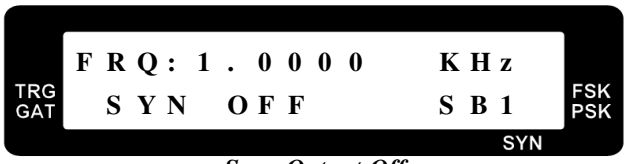
Counter Display and Attenuator/ LPF Setting

Note : Use the Att Sweep *key to set the attenuator on/off (+/-). Use the* LPF Fstep / Attn *key to set the low pass filter on/off (+/-).*

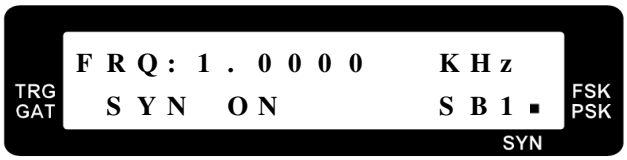


Duty Cycle Measurement

Note : Use the *key measure the duty cycle of the external input signal.*



Sync Output Off

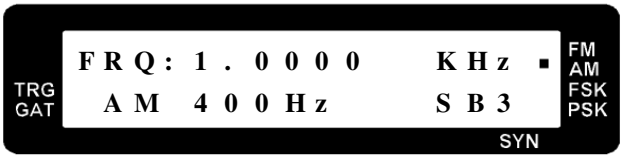


Sync Output On

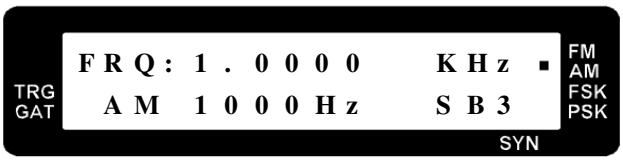
Output Offset Off

Output Offset On

AM Off

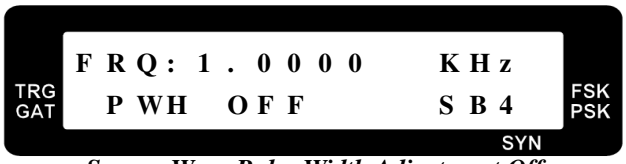


AM On, Internal 400Hz Source

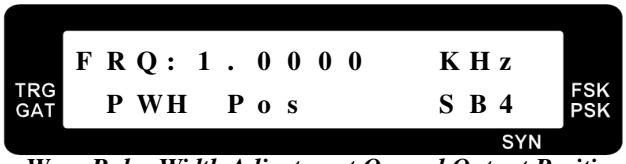


AM On, Internal 1000Hz Source

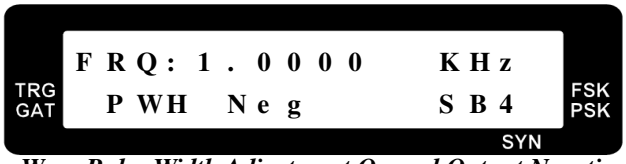
AM On, External Source



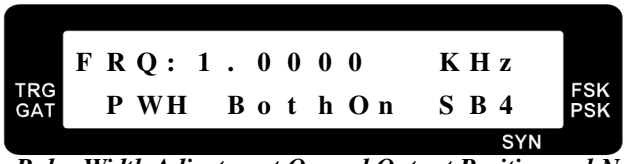
Square Wave Pulse Width Adjustment Off



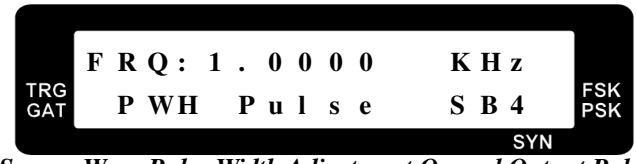
Square Wave Pulse Width Adjustment On and Output Positive Pulse



Square Wave Pulse Width Adjustment On and Output Negative Pulse

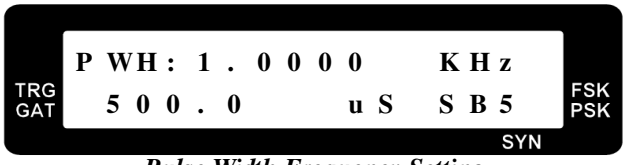


Square Wave Pulse Width Adjustment On and Output Positive and Negative Pulse

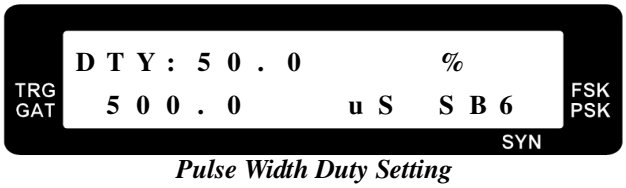


Square Wave Pulse Width Adjustment On and Output Pulse

Note : The square wave pulse width adjustment on/off selection will show up in the sub function only if the output select to square wave. If the pulse width adjustment is on, the pulse width indicator will show up.

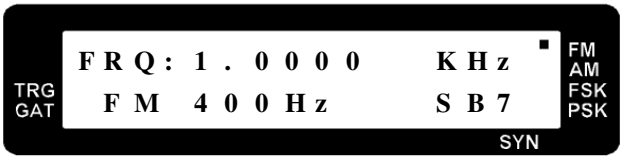


Pulse Width Frequency Setting

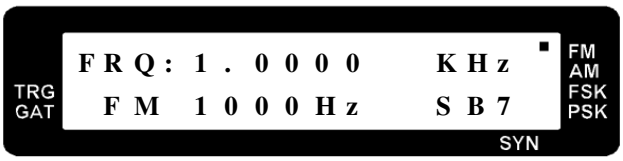


Pulse Width Duty Setting

FM Off



FM On, Internal 400Hz Source



FM On, Internal 1000Hz Source

FM On, External Source

2.13 Notice of Operating

a. For Waveform Measurement :

- The FG 700S/F series Func Out output impedance is 50Ω, so the oscilloscope input impedance must be matched to 50Ω. Use the coaxial cable for characteristic impedance 50Ω in connecting with both FG 700S/F series Func Out and oscilloscope input terminal.
- Minimizing the cable length and cable stray capacitance is very important for the best performance.
- Because the function generator output is a wideband signal, every connecting path including the transmitter or receiver, must be impedance matched to 50Ω, in order to avoid the reflection from load and the undesired testing results.

b. Output Voltage Definition :

- For FG 700S/F series output impedance is 50Ω, if the load is greater enough than 50Ω, it will result in the load voltage drop equal to the open circuit of the function generator output, approximately. If the load is 50Ω, the load voltage drop is equal to one half of the open circuit of the function generator output voltage.

c. For Small Signal Output :

- For small signal output, it is suggested to add the attenuator, for example: -20 dB, to the function generator output, and adjust the desired output level. This is the method for getting the best

signal / noise ratio.

d. For Large Signal Output :

- In general, the function generator output is 20Vp-p in open circuit, and the output current is limited to less than 100mA. For high voltage and high current output in special applications, the external power amplifier is needed.

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